REMARKS

Claims 1-22, 28-30, 33, 44, 46, 58 and 60 are rejected under 35 U.S.C. 112, second paragraph for being vague in that the main body of the independent claims lack any reference to "plurality of data sources" in the preamble. This phrase has been deleted from the preamble so that this issue is now believed to be moot. The rejected claims, as amended, are believed to comply with 35 U.S.C. 112, second paragraph.

The claims have been amended to refer to "values associated with a plurality of genes or proteins" instead of to "values associated with a plurality of genes." This is supported on page 4, lines 1-5 of the specification, where the term "associated values" is defined as a reference to biological characteristics (such as gene copy or levels of protein encoded by the genes) as well as to levels of gene expression. Since all proteins are encoded by genes, the term "proteins encoded by the genes" above can be shortened to simply "proteins." Hence the term "associated values" comprises levels of gene or protein expression.

Claims 1-22, 28-30, 33, 44, 46, 58 and 60 are rejected under 35 U.S.C. 101 for being directed to non-statutory subject matter. The independent claims have been amended to improve their clarity, and as amended, they are believed to be directed to statutory subject matter. The rejection is respectfully traversed.

The term "gene expression" is commonly used in biotechnology. Enclosed is an article from the world wide web entitled "Gene Expression: Transcription" explaining this term. From this article, it is clear that gene expression is the level of messenger RNA that results from the transcription of genes. As noted above, the term "associated values" is defined as a reference to biological characteristics (such as gene copy or levels of protein encoded by the genes) as well as to levels of gene or protein expression. The rejected claims thus comprises processes that manipulate associated values which represent real world objects and not merely abstract concepts or mathematical quantities. Hence, the rejected claims involves the manipulation of data representing physical objects or activities (Pre-computer process activity) which fits into one of the safe harbor provisions under MPEP 2106 Part IV, subpart B 2(b)i. (see page 2100-14).

Contrary to the opinion of the examiner, 35 U.S.C. 101 does not limit statutory subject matter to those that involve physical transformation outside of a computer, nor does it require performance or control of a physical transformation. Process claims involving the manipulation of data representing physical objects or activities are statutory. The Court of Appeals of the Federal Circuit has spoken a number of times on this issue, and the relevant case law can be found in MPEP 2106 Part IV, subpart B 2(b)i. The claims also do not contain merely nonfunctional descriptive material. Just as the presence of computer program in a claim does not per se render the claim non-statutory, even if merely nonfunctional descriptive material is present in a claim, this does not per se render the claim non-statutory (e.g. when claimed in a combination with other functional descriptive material on a computer-readable medium).

UTILITY

The claims are also rejected as lacking patentable utility under 35 U.S.C. 101 and 112. The rejection is respectfully traversed.

As clearly explained in the specification of this application, the processes claimed in the rejected claims are directed to the identification of genes that exhibit statistically significant behavior, which is useful for a number of specific utilities described in the specification of this application. These described specific utilities include the identification of genes whose DNA has been damaged by exposure to radiation, the identification of genes in tumors (page 18, line 24) or the identification of genes whose expression correlates with survival time of patients (page 19, line 16) or with tumor stage (sentence bridging pages 19 and 20). . These are not "throw-away", "non-specific" or "insubstantial" utilities, and indeed it would be difficult to imagine more specific or more "real world" utilities than these. Nor should the lack of utility rejection be sustained merely because the rejected claims are broad and not tied to any of the above-mentioned specific utility. Requiring applicants to limit the scope of a broad claim to a specific utility would impermissibly restrict a claim that should have been restricted only based on the prior art sections of the patent statute instead of the non-statutory subject matter section of the patent statute.

We also believe that the examiner has failed to carry the initial burden to establish a *prima facie* case and provide evidentiary support thereof, as required under MPEP 2107.01 Part IV. "A *prima facie* showng must establish that it is more likely than not that a person of ordinary skill in the art would not consider that any utility asserted by the applicant would not be specific and substantial." MPEP, page 2100-41. We believe that the examiner has not done so, in view of the very specific and substantial utilities described in the specification, such as those referred to above. Furthermore, MPEP 2107.01 Part IV (e.g. items A, B and C on page 2100-41 of the MPEP) requires the examiner to provide an explanation that clearly sets forth the reasoning used in concluding that the asserted utility (such as those referred above) for the claimed invention is neither both specific and substantial nor well-established. The examiner "does not find an adequate nexus between the evidence of record and the asserted properties of the claimed subject matter" without giving any reasoning. The examiner is further required under the MPEP to provide support for factual findings relied upon in reaching this conclusion, and an evaluation of all relevant evidence of record, such as utilities taught in the closest prior art. No factual findings were provided by the examiner in reaching the conclusion quoted above from the office action. Applicant described prior art in the background section of the specification, and filed an information disclosure statement disclosing to the patent office of references the applicants are aware of. The examiner failed to provide an evaluation of all relevant evidence of record, such as utilities taught in the prior art and references that have been disclosed to the patent office.

The examiner has apparently failed to comply with the above requirements of the MPEP, and thus has failed to carry the initial burden to establish a prima facie case of lack of utility. Instead, the examiner has impermissibly shifted the burden to applicant to establish that the rejected claims do not lack utility. This is improper.

PRIOR ART REJECTION

Claims 1, 3, 5-7, 16, 28, 58 and 60 are rejected under 35 U.S.C. 102 (a) and (e)(2) as being anticipated by U.S. Patent No. 5,908,978 to Amerson et al. ("Amerson"). The

rejection is respectfully traversed. As explained below, it is believed that Amerson is non-analogous art. Even assuming arguendo that Amerson may be considered in examining the claims of this application, we believe that the rejected claims are clearly patentable over it.

Amerson is directed to "the selection of individuals known to carry genes for desirable traits is useful in the propagation of plants with the desirable characteristics." Column 14, lines 46-48. The examiner is of the opinion that this means Amerson discloses the feature of gene difference information. By "gene difference information," we believe that the examiner means "information concerning differences in the associated values of that gene or protein among the sets", such as that in claim 1. Assuming that this is the case, we disagree with the examiner's opinion. In one embodiment, "differences in the associated values of that gene or protein among the sets" refer to the differences in the levels of messenger RNA from the transcription of genes or proteins. This has nothing to do with selection of individuals based on genetic markers for desirable traits.

The American Heritage® Dictionary of the English Language: Fourth Edition. 2000 defines a "genetic marker" as: "A gene or DNA sequence having a known location on a chromosome and associated with a particular gene or trait. Genetic markers associated with certain diseases can be detected in the blood and used to determine whether an individual is at risk for developing a disease." In column 16 line 39 to column 17, line 28, relied on by the examiner, Amerson uses a Log of the Odds (LOD) method for estimating genetic distances between genetic markers. LOD is one of a number of conventional methods for estimating genetic distances. Even though Amerson mentions measures of statistical significance in this section, such significance refers to a departure from expectation in a biological reproduction process such as mating. In one embodiment, the feature of "identifying genes or proteins whose associated values differ by an amount of statistical significance among the sets" (e.g. in claim 1) refers to the identification of genes or proteins whose levels of messenger RNA from the transcription thereof differ by an amount of statistical significance among the sets. Hence, such section of Amerson (column 16, line 39 to column 17 line 29) appears to be irrelevant with respect to the feature in the rejected claims. The LOD method is explained more clearly

in the attached article " LOD Score Method of Estimating Linkage Distances," available from the world wide web.

The examiner is of the opinion that adjusting the parameters of the plurality of genes or proteins so that the parameters are substantially independent of scatter values or average associated values of the genes over the sets is taught in column 30 line 34 to column 31, line 4 of Amerson. We disagree. Nowhere does Amerson in such section teach or suggest such feature. This section of Amerson appears to describe the placement of genetic markers within certain distances from the framework marker, and the fact the genetic markers appear to cluster at certain loci. This section further opines that the reason for the ordering ambiguity is the small size of the sampling (limited number of meioses). Hence, this section also appears to be irrelevant with respect to the feature (i.e. adjusting the parameters of the plurality of genes or proteins so that the parameters are substantially independent of scatter values or average associated values of the genes or proteins over the sets) in the rejected claims. If the examiner disagrees, it is respectfully requested that the examiner explain in detail, by referring more specifically to line numbers in Amerson. The last three lines of claim 1 recites: "comparing the observed and expected values of the parameter to identify genes or proteins whose associated values differ by an amount of statistical significance among the sets." This has nothing to do with identification of genes with desired traits, contrary to the opinion of the examiner in the office action. If the examiner disagrees, it is respectfully requested that the examiner explain in detail why this is so.

It is well settled that, in order for a reference to anticipate a claim, there must be identity of elements between those of the reference and those of the claim. Amerson simply appears to be irrelevant with respect to the rejected claims, and there is simply no identity between them at all. This is true for all the rejected claims. Furthermore, in view of the vast differences such as those discussed above, there is no reason or motivation to modify Amerson to arrive at the invention of the rejected claims.

A reference is non-analogous art if it is not within the field of endeavor of the invention of the rejected claim and not reasonably pertinent to the particular problem with which the inventors are involved. In re Deminski 230 U.S.P.Q. 313-315 (Fed. Cir. 1986). Amerson is directed to a method for the selection of individuals known to carry

genes for desirable traits useful in the propagation of plants with the desirable characteristics. As one example, Amerson uses genetic markers to determine whether a quantitative trait is a heritable oligogenic trait in a woody perennial plant. See Abstract of Amerson. This has nothing to do with the issue in the rejected claims of analyzing a plurality of sets of values associated with a plurality of genes or proteins to identify genes or proteins whose associated values differ by an amount of statistical significance among the sets, in view of the meaning of the term "associated values" explained above. Hence Amerson is clearly not within the field of endeavor of the invention of the rejected claims. Furthermore, the particular problem with which the inventors are involved is to be able to identify genes or proteins whose associated values differ by an amount of statistical significance among the sets, despite scatter or average values, such as caused by the differences in cell lines and other factors and described in certain embodiments in the specification. Amerson is totally silent on these issues. Both prongs of the test having been met, we believe that Amerson is non-analogous art, and should be removed as a reference.

Claim 28 includes the limitation of "providing an expected value of such parameter for each rank, wherein said providing includes permuting the associated values in the original sets to arrive at sets different from the original sets for each permutation, deriving a value of such parameter for each permutation, and ranking such values; and comparing the calculated and expected values for the parameter of the same rank to identify genes or proteins whose associated values differ by an amount of statistical significance among the sets." The examiner has failed to address such limitations of claim 28 but nevertheless rejects it in view of Amerson. The examiner has thus failed to carry the initial burden for the rejection and the rejection therefore fails. It is further believed that such limitations are not taught or suggested by Amerson. The examiner has also failed to address the limitations in claims dependent on claims 1 and 28. It is believed that such limitations are not taught or suggested by Amerson.

Since the examiner has failed to carry the initial burden in a number of rejections, the next office action should not be a final action.

Claims 1-22, 28-30, 33, 44, 46, 58 and 60 are presently pending in the Application. Reconsideration of the rejections and an early indication of the allowability of all the claims is earnestly solicited.

Attachments:

1. Article entitled "Gene Expression: Transcription" (7 pages)
2. Article entitled "Lod Score Method of Estimating Linkage Distances" (3 pages)

Certificate of Mailing Under 37 CFR 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope address to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 19, 2005.

Franklin Dyer

Respectfully submitted,

1/19/05

James S. Hsue
Reg. No. 29,545

Date